

PATENT

Serial No. 10/757,314

Docket No. JSF01-0002/WJT08-0053

a third resonator ~~located on a third layer of dielectric material or low temperature co-fired ceramic~~ coupled to said second resonator and cross coupled to said first resonator;

an input transmission line connected to said first resonator;

an output transmission line connected with said third resonator; and

a MEMS based varactor in at least one of said resonators.

26. (Original) The voltage-controlled tunable multilayer filter of claim 25, wherein said MEMS varactor uses a parallel plate topology.

27. (Original) The voltage-controlled tunable multilayer filter of claim 25, wherein said MEMS varactor uses an interdigital topology.

REMARKS

Reconsideration of this application is respectfully requested in light of the above amendments and following remarks. Claims 1 – 7, 9 – 19 and 21 - 27 remain in the application; claims 1, 4 – 7, 9, 10, 12, 13, 16, 18, 19, 21, 22, 24 and 25 have been amended. Claims 8 and 20 have been canceled.

I. Regarding the objection of claims 1 – 27 under 35 U.S.C 112, second paragraph, Applicant has amended claims 1, 13 and 25 to delete “located on a third layer of dielectric material” maintaining claim element relationship with “coupled to said second resonator and cross coupled to said first resonator”. Applicant thus submits that with this deletion, this rejection has been rendered moot. Further, the objection of the drawings under 37 CFR 1.83(a) should be rendered moot as there is no longer a reference to a third dielectric layer in any claims.

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II. Regarding the rejection claims 4 and 16 because "said DC biasing lines" lack antecedent basis, Applicant has amended claims 4 and 16 to delete "lines" and replace that term with "circuit" which has antecedent basis in claim 3. Claims 1, 13 and 25 were amended to include "low-temperature-co fired-ceramic (LTCC)" with the acronym "LTCC" in parenthesis and claims 5 and 17 deleted the term "tape" to avoid any lack of clearness in claims 5 and 17. Regarding the rejection of claims 6 and 18 because "the inner ground plane" and "the stripline structure" lack antecedent basis, Applicant has amended claims 6 and 18 as follows to traverse this rejection:

6. (Currently amended) The voltage-controlled tunable multilayer filter of claim 5, wherein at least two of said nine layerers are used as an the inner ground plane to implement a the stripline structure.

18. (Currently Amended) The method of using voltage to tune a multilayer filter of claim 17, wherein at least two of said nine layerers are used as an the inner ground plane to implementa the stripline structure.

Regarding the rejection of claims 7-10 and 19-22, as "layer 2", "layer 6" and "layer 1" were confusing as to whether "2", "6" and "1" are used as reference characters, Applicant has implemented the Examiners suggestion of using "second layer", "sixth layer" or "first layer" in claims 7, 9, 10 and 19, 21, 22.

Regarding the rejection of claims 8 and 20, Applicant has cancelled claims 8 and 20.

Applicant has amended claims 10, 12, 22 and 24 that were rejected as lacking antecedent basis.

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III. The oath or declaration was considered defective for the filing date of the provisional application. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is submitted with this response.

IV. Claims 1-27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Peters (US '259) in view of Liang et al. (US 6,492,883). The office action stated, Peters (figs. 4A-4C) discloses a multilayer filter comprising: a first resonator 208a on a first dielectric layer 202c; a second resonator 206 coupled to the first resonator on a second dielectric layer 202b; and a third resonator 208b on the first dielectric layer coupled to the second resonator and cross coupled to the first resonator; an input transmission line 207a connected to the first resonator; and an output transmission line 207b connected to the third resonator; and two ground planes 200, 203 are provided on upper and bottom planes.

Applicant agrees with the Examiner that Peters does not show a variable capacitor is coupled to at least one of the resonators; but respectfully disagrees that providing a variable capacitor in a resonator to tune a resonant frequency is well known in the art. Xiao-Peng Liang, the named inventor of the cited art and employee of the assignee of the present invention, Paratek Microwave, has worked with colleagues diligently over several years to enable the use of variable capacitors (specifically voltage tunable variable capacitors and in one embodiment, voltage tunable dielectric varactors) in an electronically tunable multilayer microstrip-stripline combline filter that is operable over a wide frequency band and that is small in size. Indeed several obstacles needed to be overcome for just such an implementation such as Variations of the capacitance of the tunable capacitor affecting the distribution of the electric field in the filter and the determination and controlling of how that in turn varies the resonant frequency. If it were indeed "plug and play" with respect to using voltage tunable capacitors in a resonator that is part of a multilayer filter, Mr. Liang, could have avoided some very late nights counseling his colleagues at Paratek with countless trial and error in developing the present invention; trials which included experimenting on the need for several layers of dielectric material or low-

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temperature-co fired-ceramic (LTCC) tape and designing the optimal number of poles in conjunction with the number of layers provided. If the Examiner feels it would be beneficial, Applicant can submit an affidavit by Mr. Liang affirming the aforementioned.

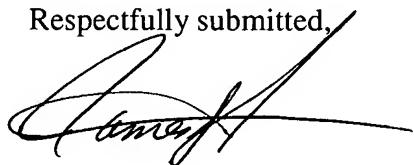
Additionally, Applicant respectfully submits that the Examiner cannot satisfy the basic requirements of a *prima facie* case of obviousness by using Peters and Liang et al. to reject pending independent. First, there must be some suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the references. Second, there must be some reasonable expectation of success. Finally, the references when combined must teach or suggest all of the claimed limitations. Manual of Patent Examining Procedure, Section 2143. Applicant submits that neither Peters nor Liang suggest or teach the claimed invention nor is there a reasonable expectation of success (for the reasons set forth above). Again, not only does Liang not teach or suggest the combination, but he, as an expert in the field, relied on colleagues at the same company to develop the present invention through great effort.

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CONCLUSION

Applicant thanks the Examiner for his time in examining the present application and respectfully submits that, in view of the foregoing amendments and remarks, the application is in clear condition for allowance. The Office is hereby authorized to charge any additional fees or credit any overpayments under 37 C.F.R. 1.16 or 1.17 to Deposit Account No. 502697. The Examiner is invited to contact the undersigned at 202-607-4607 to discuss any matter regarding this application.

Respectfully submitted,



James S. Finn
Registration No. 38,450

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14431 Goliad Dr., Box #8
Malakoff, TX 75148
(202) 607-4607 (phone)
202-318-2450 (eFax)